

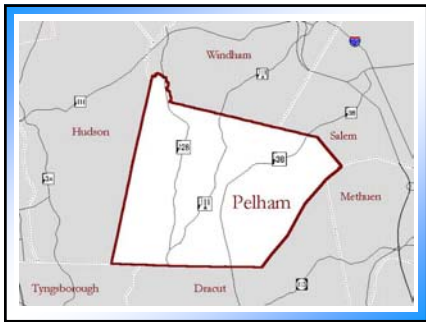
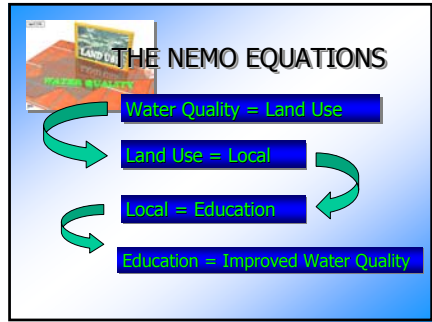


Managing Growth & Sustaining Water Quality

PELHAM, NH

UNIVERSITY OF
NEW HAMPSHIRE
COOPERATIVE EXTENSION

UNIVERSITY OF CONNECTICUT
COOPERATIVE EXTENSION SYSTEM



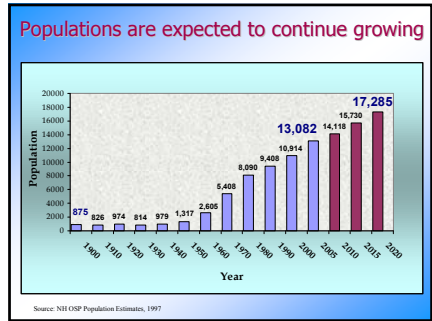
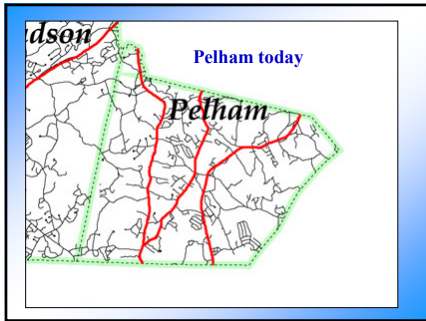
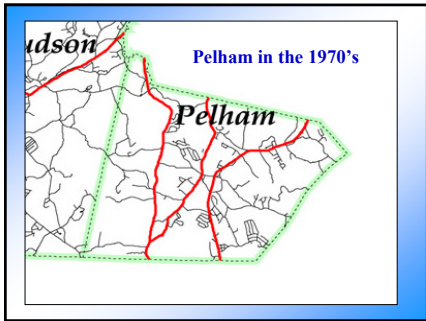
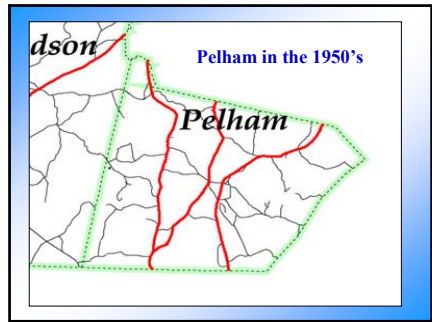
History/Background/Trends

1746 - Incorporated as a town

1764 -1807 - six conservation laws passed protecting fish, game and timber

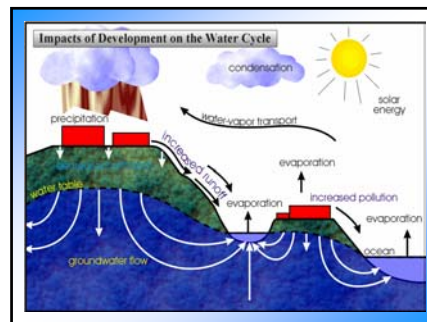
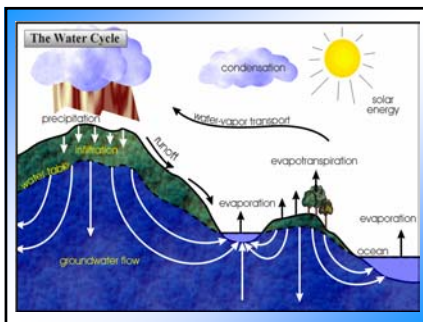
1824 - Annexed by Hillsborough County

1940s - Pelham experiences growth pressures from Massachusetts





*What does this mean
to Pelham and its
water quality??*



Impervious surfaces

- inhibit recharge of groundwater
- prevent natural filtration of pollutants through the soil
- provide a surface for accumulation of pollutants
- transport pollutants to waterways

Runoff may pick up and transport pollutants from the ground to the waterbody

This is referred to as *nonpoint source pollution*.

Did you know??

Nonpoint source pollution, or polluted runoff, is the #1 water quality problem in the U.S...

Source: EPA

In New Hampshire...

Priority NPS categories:

1. Urban Runoff
2. Hydrologic & Habitat Modifications
3. Subsurface/Septic Systems
4. Junk/Salvage Yards
5. Construction

Major Sources of Nonpoint Source Pollution

Lawns and Golf Courses	Car Exhaust and other Air Pollution
Agriculture	Road and Building Construction Sites
Roads and Parking Lots	

The Pollutants in Polluted Runoff

Nutrients
Pathogens
Sediment
Toxic Contaminants
Debris
Thermal Stress

Nutrients

- such as nitrogen and phosphorus
- needed for plant growth
- elevated levels can cause a health hazard in drinking water
- elevated levels stimulate excessive aquatic plant growth which lowers dissolved oxygen levels



Sources of nutrients: animal waste, lawn fertilizer, septic systems

Phosphorus

A nutrient used by plant life

The limiting nutrient for fresh water plants

Source: NH DES Environmental Fact Sheet #WD-BB-20

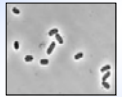
Excessive levels of Phosphorus can accelerate plant growth and cause algal blooms



The Pollutants in Polluted Runoff

Nutrients
Pathogens
Sediment
Toxic Contaminants
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Thermal Stress

Pathogens

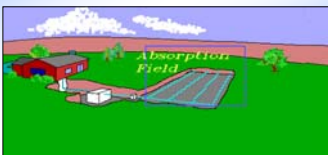


- disease-causing bacteria and viruses
- associated with the presence of fecal matter
- elevated levels can cause a health hazard in drinking water

Sources of pathogens: failing septic systems, animal waste, manure storage

Septic Systems

- Use leach field to filter waste material from household systems
- Leach field allows for slow percolation into the soils below.



Source: NH DES Environmental Fact Sheet #WD-BB-11

The Pollutants in Polluted Runoff

Nutrients
Pathogens
Sediment
Toxic Contaminants
Debris
Thermal Stress

Sediment

- eroded soil or sand
- smothers aquatic habitat
- carries pollutants
- reduces water clarity because of suspended solids




Sources of Sediment: road sand, developments and construction sites, agricultural fields, eroding slopes, disturbed areas



The Pollutants in Polluted Runoff

- Nutrients
- Pathogens
- Sediment
- Toxic Contaminants**
- Debris
- Thermal Stress

Toxic Contaminants



- often resistant to breakdown
- compounds like heavy metals and pesticides
- threaten the health of both aquatic and human life

Sources of toxic contaminants: industrial, commercial, household and agricultural chemicals, auto emissions

The Pollutants in Polluted Runoff

- Nutrients
- Pathogens
- Sediment
- Toxic Contaminants
- Debris**
- Thermal Stress

Debris



- includes plastics and other trash
- threatens aquatic life
- detracts from recreational and aesthetic values


Sources of debris: construction materials, illegal dumping, street litter, boating waste



The Pollutants in Polluted Runoff

- Nutrients
- Pathogens
- Sediment
- Toxic Contaminants
- Debris
- Thermal Stress**

Thermal Stress



- elevation in water temperature
- harm native species of vegetation
- helps nonnative species to spread

Source of thermal stress: runoff from heat-absorbing impervious surfaces, removal of streamside vegetation, shallow water impoundments, decreased base flow

How does Polluted Runoff Affect

WATERSHEDS?

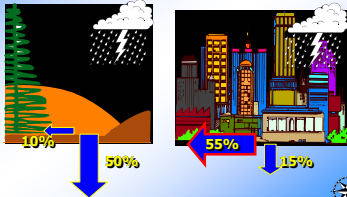
Watershed:

All the
land that
drains to
a
common
body of water



**The health of
a waterbody is directly
related to the health of
the watershed.**

Development Impacts on the Water Cycle



Sources of Residential NPS

- Nutrients:** lawn fertilizers & septic system effluent
- Pathogens:** failing septic systems, pet waste, manure storage
- Sediment:** construction, road sand, erosion from lawns & gardens
- Toxic:** household products, pesticides
- Debris:** litter & illegal dumping
- Thermal:** removal of streamside vegetation



Sources of Commercial/Industrial NPS

- Nutrients:** fertilizers and pesticides
- Sediment:** construction, road sand, roadside erosion
- Toxic:** auto emissions, industrial pollutants
- Debris:** litter & illegal dumping
- Thermal:** heated runoff from impervious surfaces, removal of streamside vegetation



Sources of Development NPS

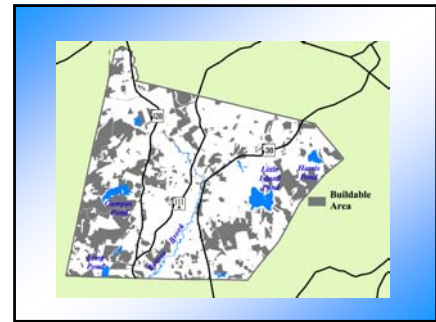
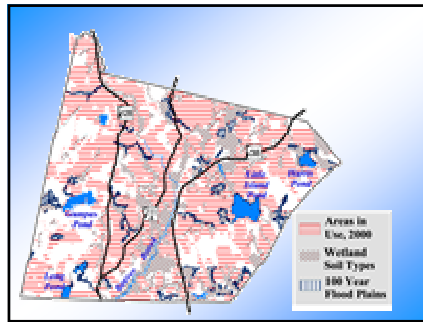
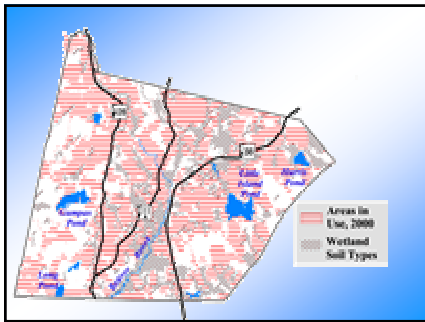
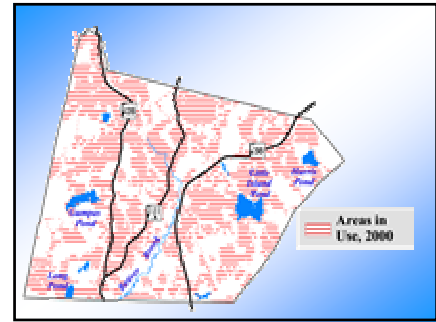
- Sediment:** unstable slopes, erosion, siltation of detention basins, wetlands & waterways
- Toxic:** oily runoff
- Debris:** construction debris, dead vegetation
- Thermal:** removal/lack of streamside vegetation



Buildout process:

Utilize computer mapping to analyze development potential of an area based on the following constraints:

- Subtract out area of existing uses
- Subtract out wetland soil types
- Subtract out 100 year floodplains



Remaining buildable area: 4,777 acres

Based on current zoning (2001)*:

4,088 potential house lots

156 potential commercial lots

* Pelham requires 1 acre minimum lot size for single family dwelling units and 1.5 acres for commercial uses

How do we deal with all this

GROWTH?

Three local actions to improve water quality:

1st: Comprehensive Planning to Reduce Impervious Surfaces

An Alternative Approach

- Goals of Open Space Development
 - Conserve most noteworthy natural resources
 - Provide functional greenways
 - Reduce impervious surfaces
- Most important factor
 - Get ALL THE INFORMATION you need to make an informed decision



An Alternative Approach

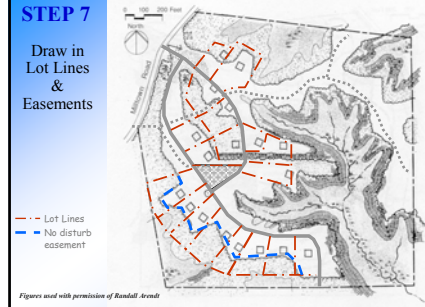
Seven Steps:

1. Determine Density
2. Identify Primary Conservation Areas
3. Identify Secondary Conservation Areas
4. Identify Building Area
5. Locate Houses
6. Align Streets & Trails
7. Locate Lot Lines

Source: Arendt, Randall, *Growing Greener* (Washington D.C., Island Press, 1999)

STEP 7

Draw in Lot Lines & Easements



Figures used with permission of Randall Arendt

Three local actions to improve water quality:

1st: Comprehensive Planning to Reduce Impervious Surfaces

2nd: Site Design

Site Design & Erosion Control:

- Minimize impervious surfaces
- Utilize effective stormwater systems



Are your current drainage systems working properly??

Storm drains need to be cleaned regularly



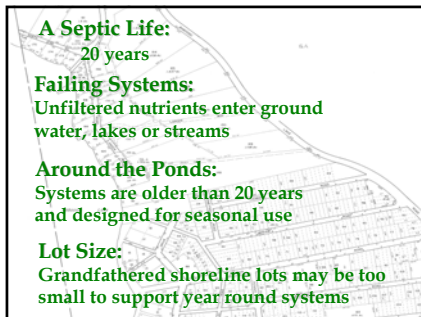
Open drainage systems offer a means of collecting and absorbing runoff

A Septic Life:
20 years

Failing Systems:
Unfiltered nutrients enter ground water, lakes or streams

Around the Ponds:
Systems are older than 20 years and designed for seasonal use

Lot Size:
Grandfathered shoreline lots may be too small to support year round systems



Three local actions to improve water quality:

1st: Comprehensive Planning to Reduce Impervious Surfaces

2nd: Site design

3rd: Best Management Practices

Tips for maintaining septic systems

*Inspect septic system and pump on a regular schedule



*Compost kitchen garbage rather than using a disposal.

*Conserve water whenever possible

*Never flush toxic materials (such as paint, oil or pesticides) down drain.



BMP's for Construction Sites and Developments

- Retain natural vegetation where possible, especially around water bodies, wetlands and steep slopes
- Minimize duration of bare soil exposure
- Prevent erosion by mulching, matting or other cover for all concentrated flow areas
- Minimize slope lengths and properly divert runoff around disturbed areas
- Monitor practices and adjust, maintain, and repair periodically and after every storm

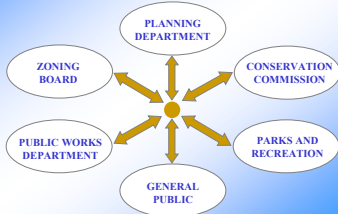
Source: NH DES "Nonpoint Source Pollution: A Guide for Citizens and Town Officials, May 1994

If we are seeing problems today,

**we can accept it
OR
plan development activities
accordingly...**

This requires a community effort!

Water Quality Requires Town-Wide Cooperation



THE BOTTOM LINE

**It is up to us!
We need to take
action today!**

Questions or Concerns???

- Town of Pelham
Planning Department - 635-7811
Health Inspector - 624-1602
- Nashua Regional Planning Commission
(603) 883-0366 www.nashuarpc.org
- Department of Environmental Services
(603) 271-3503 www.des.state.nh.us/
- Environmental Protection Agency-Office of Water
www.epa.gov/ow/citizen.html